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SOCIOLOGICAL SPECULATIONS.

A Modern Utopia. By H. G. Wells. Pp. xi+393. (London: Chapman and Hall, Ltd., 1905.) Price 7s. 6d.

IT is instructive to watch the growth, both in power and in hopefulness, of Mr. Wells's criticism of life. In the "Time Machine" his forecast of the future of humanity was frankly appalling; in "When the Sleeper Wakes," more lurid (albeit far more probable) than the worst imaginings of "reforming" socialists. "Anticipations" was a most stimulating book, but so deliberately confined itself to exalting and exaggerating the prospects of a single aspect of life, so exclusively devoted itself to glorifying mechanical and material progress, that those sensitive to our spiritual and æsthetic possibilities might be pardoned for regarding the present order, with all its cruelty, waste, sordidness, and grotesqueness, as a golden age in comparison with Mr. Wells's world. "Mankind in the Making" contained much vigorous criticism and many sensible and practical suggestions. In the present book Mr. Wells has become still more moderate and practicable and hopeful, without in the least derogating from his ingenuity and originality. We sincerely hope, therefore, he will not, as he threatens, stick henceforth to his "art or trade of imaginative writing," but will continue from time to time to regale and stimulate us with sociological speculations.

Stripping off the romantic form—in which Mr. Wells dreams himself and a companion, a botanist suffering from a chronic affair of the heart, into a distant planet which is an exact duplicate of our earth, save that it has realised all the good which is attainable with our present resources—his main argument may be condensed as follows.

As the philosophic foundation of his whole enterprise, Mr. Wells assumes what he calls the "metaphysical heresy" (though it is rapidly forcing itself upon the notice even of the most stagnantly "orthodox" philosophers) that all classifications, though convenient, are crude, and that whatever is real and valuable in the world is individual, a thesis he had expounded in the brilliant contribution to *Mind* entitled the "Scepticism of the Instrument," which he has now reprinted as an appendix to his book. From this philosophy he infers that progress depends on individual initiative and variation, leading to successful experiment. Hence the infinite preciousness of freedom, which the Utopian World-State must restrict only when and in so far as it would oppress the freedom of others. Hence, too, there will be extensive toleration of "cranks," while even criminals would merely be segregated as failures and condemned to work out their ideas of a good life in a society of their likes, after a fashion charmingly described in the account of the arrival of involuntary immigrants at the "Island of Incurable Cheats." But though Utopia is strangely kind to the cranky, the criminal and the inefficient, because it regards

their occurrence as the measure of the State's failure it does not allow them to reproduce their kind. Parentage is a privilege, and the production of superior offspring a service to the community for which a wise State will handsomely reward its women.

But the efficiency and prosperity of the Utopian order ultimately depend on the ruling class, which Mr. Wells seems to have taken bodily out of the Platonic Republic, and, with a fine compliment to the unparalleled rise of Japan, entitled the "Samurai." The Samurai are conceived as a "voluntary nobility" which (like the mediæval Church) all may enter who are able and willing to lead the strenuous and somewhat ascetic life prescribed by the rules of the Order. Among these the obligations to buy and read every month at least one book published in the last five years, and every year to go out into the wilderness and to travel through it in silence and solitude for at least seven days, are perhaps the most noticeable, together with the prohibition of acting, singing and reciting, and the playing of games in public.

It is remarkable how Platonic is the general spirit of these institutions in all save the high appreciation of individual freedom, to the value of which Plato showed such singular blindness. Nor is their general aim hard to discover. At several points, however, a critic will be disposed to doubt whether Mr. Wells's means are adequate to his ends. He has seen, indeed, what never seems to have occurred to Plato, that if wisdom is to control the State, elaborate precautions must be taken to keep learning progressive, and to prevent it from fossilising into pedantry. The Platonic State, if it could ever have come into existence, would systematically have suppressed originality, and simply have stereotyped the condition of science and art prevailing at the date of its institution. If it could be conceived as surviving to the present day, it would still be sending its heroic hoplites against quick-firing guns, and still be punishing a belief in evolution or metageometry as heresies worthy of death. Mr. Wells seeks to guard against the universal human tendency to fix in rigid forms whatever man admires. But though he insists on the importance of preserving the "poietic," *i.e.* originative, types of man and endowing their researches, it may be doubted whether even under his laws they would not be overpowered by the "kinetic," *i.e.* the efficient administrators, who everywhere conserve the established order. For these latter would control the Order of the Samurai.

Again, Mr. Wells's distrust of eugenics, justified as no doubt it is by the present state of our knowledge, seems unduly to disparage the prospects of scientific discovery in the future. It does not follow that because now we know too little to entrust the State with the function of controlling the reproduction of the race, this will continue to be unsafe, and it is easy to imagine circumstances in which such control would become almost inevitable. For example, if one of the many attempts to discover what determines the sex of an embryo should chance to be crowned with success, the numerical equality of the

sexes would in all probability be gravely imperilled, and the State would almost certainly have to intervene. Again, while Mr. Wells is doubtless within his rights in scoffing at the racial prejudices of the time, in his scorn of popular notions of "superior" races, "including such types as the Sussex farm labourer, the Bowery tough, the London hooligan, and the Paris apache," and in his contention that "no race is so superior as to be trusted with human charges," his anticipation of wholesale racial fusions seems to involve a serious underestimate of the æsthetic instincts. Lastly, although Mr. Wells has keenly perceived the spiritual value of a temporary retreat from society, it may be doubted whether he does not purchase its advantages at too high a cost. The solitary voyages of his Samurai would assuredly lead to a high death-rate among them, and though one type of mind was thereby strengthened, another would be unhinged. The rule, in short, seems too rigid for the variety, and too cramping for the freedom, of man, both of which Mr. Wells is elsewhere anxious to appreciate. But Mr. Wells, on the whole, shows a wisdom far superior to that of former Utopists in not seeking to construct out of the imperfect materials which alone the actual can furnish a static order which shall be, and if possible remain eternally, perfect. He aims rather at laying down the principles of an order which shall be capable of progressively growing towards perfection; and so it may well be that in his ideal society men will be less reluctant than now to learn from experience.

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THERMODYNAMICS.

Thermodynamik. By Dr. W. Voigt. Vol. ii. Pp. xii + 370. (Sammulung Schubert, xlviii.) (Leipzig: G. J. Göschen, 1904.)

Diagrammes et Surfaces thermodynamiques. By J. W. Gibbs. Translated by G. Ray, of Dijon, with an introduction by B. Brunhes, of Clermont. Pp. 86. (Paris: Gauthier-Villars, 1903.)

THE second volume of "Thermodynamik" deals essentially with applications. It is divided into two parts, devoted to thermochemical changes and thermoelectric changes respectively. Under the first heading are included changes of phase of a single substance, which occupy the first 168 pages. In this connection we have sections dealing with Van der Waals's formula, steam and gas engines, the equilibrium of an atmosphere of water vapour, and the Hertizian adiabatics. The next chapter deals with phases formed of more than one component, the properties of binary mixtures occupying about 80 pages, and those of a system with more than two components being treated subsequently. The part dealing with thermoelectric changes contains a good bit of introductory matter on electrostatics. In the third chapter of this part the properties of black-body radiation are discussed at much length.

The subject of thermodynamics can be defined in various ways. In its most restricted sense it deals exclusively with the first and second laws and direct

deductions from them, in just the same way that dynamics deals with direct deductions from the laws of motion. But the name thermodynamics is often used to include all phenomena directly or indirectly associated with heat, and it is in a fairly broad sense in this respect that Dr. Voigt deals with the subject. A good many of the formulæ are based more or less on experiment or reasoning not directly connected with the two laws of thermodynamics. Thus, for example, in the chapter on radiation the only piece of work which can be regarded as thermodynamical in the narrower interpretation is the proof of the equation by which Stefan's law is deduced from the formulæ for radiation pressure. But in addition to this we have here a general discussion of radiation based on electrodynamical considerations, Wien's law, Planck's law of mixture, and Kirchhoff's theorem. The relation between the black radiation and wave-length is in no way deducible directly from the first and second laws.

These examples may be taken as affording some indication of the extended scope of the book. Passing to matters of detail, the author is to be congratulated on the lucid way in which he clears up many points usually regarded as obscure. We may instance the detailed discussion of the thermodynamical potential of a gas-mixture (§ 69), a point which receives scanty attention in many books we have seen. The author's task is made easier by the fact that most of the higher applications of thermodynamics deal with *equilibrium*. Now, whether we deduce the conditions of equilibrium from making the available energy a minimum, the entropy a maximum, or by any other equivalent hypothesis, the variation of the function selected must in general vanish to the first order, so that the conditions of thermodynamic equilibrium (apart from stability) are deducible from the equations of *reversible* thermodynamics. Very little is said in this book about irreversible phenomena, and this is perhaps fortunate owing to the great difficulty of dealing with these phenomena in a clear and logical way. The kind of impression which a beginner is likely to form in reading about irreversible thermodynamics may be exemplified by the following three apparently contradictory statements:—"The increase of entropy is dQ/T ." "The entropy of the universe tends to a maximum." "For a cyclic irreversible cycle $\int dQ/T < 0$."

It would be hardly an exaggeration to assert that whether any statement in irreversible thermodynamics is right or wrong depends entirely on the way of looking at it. For example, in § 105 a very little is said about irreversible electric phenomena, which is doubtless correct according to the author's interpretation; but whether this is the best way of stating the case is necessarily a matter of opinion.

In connection with the continuity of the liquid and gaseous states, the rule for the horizontal line in the isothermal diagram is deduced from van der Waals's equation (p. 151), and is not treated as a general result. In this method, however, the significance of the rule is somewhat lost. The proper condition that the rule may hold good is that the liquid and gaseous